REMARKS/ARGUMENTS

The office action of March 15, 2007 has been carefully reviewed and these remarks are responsive thereto. Reconsideration and allowance of the instant application are respectfully requested. Claims 1-4 remain pending in this application. Claims 1 and 3 have been withdrawn.

Rejections under 35 U.S.C. § 103

Claims 2 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 6,104,837 to Walker and U.S. patent no. 6,630,931 to Trika et al. ("Trika"). Applicant respectfully traverses this rejection.

The action alleges that Walker discloses all the features of independent claim 4, but for "the transmitted video signal enabling conversion of the 2D images and viewing of the converted 2D images in a stereoscopic viewing system." In an attempt to remedy this defect, the action relies on Trika pointing to the Abstract. The action contends that one skilled in the art would have combined Walker and Trika to obtain the claim 4 invention "to enhance the flexibility of the image processing method." To the contrary, Applicant submits that one skilled in the art would not have modified Walker with Trika to obtain the claim 4 invention as discussed below.

Walker discloses a compression method and apparatus for use in image data processing where two-dimensional pixel images have respective relative depths specified on a per pixel basis. Contextually, Walker relates to an application in which "two or three planar images form the component material with each of the images having a respective absolute depth value defined for substantially all of the pixels." (Col. 1, lines 18-21). There are important issues relating to the use of depth maps in this context.

1. There are multiple image planes, each with an associated depth map.

2. The depth map does not fully cover the entire image for each plane (e.g. "substantially"). For example, if an image plane encodes a vehicle as described in the detailed description (Col. 4, lines 21-26) then the depth map only covers the section of the image plane in which the vehicle is visible.

3. The depth value of each pixel is only used to determine which pixels from the multiple layers are visible to the user. "The STB is then responsible for generating the composite image of vehicle sprites overlying the server-supplied video background" (Col. 4, lines 29-31). That is, Walker is effectively only

providing the respective depth of each frame so that a user is able to determine which objects are in the foreground and which objects are in the background.

Issue 3 is particularly pertinent when considering the use of a depth map for rendering stereoscopic images. The depth compression scheme proposed by Walker attempts to reduce the amount of information stored in the depth data (the volume of depth data) relative to the application of combining multiple image planes.

Notably, the compression techniques described in Walker are not compatible for applications in which the depth maps are used for stereoscopic rendering. First, Walker describes assigning a common depth value to adjoining pixels of similar depth (Col. 2, lines 12-14). This technique has the undesirable effect of removing the 3D surface relief of objects and making those objects appear flat in stereoscopic 3D. Moreover, the compression utilized by Walker includes reassigning the depth values (Col. 2, lines 21-26); this process is designed to compress the information into the smallest number of bits for encoding. While the compression process has no impact on the ordering of the image planes in the context of Walker's invention, for stereoscopic 3D the compression process would effectively collapse the overall depth range down, leading to very shallow, undesirable 3D stereoscopic perception. In sum, one skilled in the art would not have looked to or applied the compression techniques described in Walker because such techniques could not be effectively used as the basis of a depth transmission mechanism for stereoscopic rendering. Significantly, the compression is "loss" in the sense that vital 3D geometric information is discarded in order to compress the data making it unsuitable for stereoscopic rendering. Consequently, on skilled in the art would be lead away from using Walker in such a context. Combining Trika with Walker does not avoid these significant problems.

Trika describes a method of accelerating the rendering of stereoscopic images from computer graphics models by estimating one eye from the other eye. For example, estimating or reconstructing what the right eye view would look like given the left eye and the depth information stored in the depth map. Namely, Trika "provides that either the left image or the right image of a scene is approximated based on the other. However, for the purposes of the description only, it shall be assumed henceforth that the right image is approximated from the left image unless otherwise stated" (Col 5, lines 53-57). Significantly, Trika uses depth

information stored in a z buffer (Col. 2, lines 47-48). A z buffer encodes the distance from the camera of each pixel in a scene. One or ordinary skill in the art would not have compressed and transmitted a z buffer using Walker and then subsequently reconstructed the left (or right) eye as it would have caused severe distortion to the encoded data.

It follows that one skilled in the art would not have modified Walker with Trika to obtain the claim 4 invention with the knowledge of the multitude of problems discussed above. Indeed, the combination of Walker's compression and Trika's stereo view reconstruction are incompatible in reference to both the form of the depth data used and the function for which the depth data is used.

For at least the reasons set forth above, claim 4 and claim 2, which depends from claim 4, are patentably distinct over the combination of Walker and Trika.

Claims 2 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of U.S. patent no. 5,617,334 to Tseng et al. ("Tseng") and Trika. Applicant respectfully traverses this rejection.

The action alleges that Tseng discloses all the features of independent claim 4, but for "the transmitted video signal enabling conversion of the 2D images and viewing of the converted 2D images in a stereoscopic viewing system." In an attempt to remedy this defect, the action relies on Trika point to the Abstract.

The action contends that Tseng discloses a method of "receiving 2D images (I_c^t) and depth data (D_c^t) relating to the 2D images." The action relates "2D images" as claimed to I_c^t and the "depth map" as claimed to D_c^t relying on Tseng at col. 3, lines 47-62. Significantly, depth map D_c^t is not "received" as claimed. Instead, depth map D_c^t is *created* from the multiple viewpoint images, as described in Tseng at col. 3, lines 61-62. Trika does not cure this defect. Thus, the combination of Tseng and Trika does not teach or suggest receiving 2D images *and depth map data* relating to the 2D images as called for in claim 4.

Moreover, Tseng requires access to multiple viewpoint images in order to generate the depth map. Such multiple viewpoint images are not available in Trika. For this reason, one skilled in the art would not have combined Tseng and Trika to obtain the claim 4 invention.

Also, Tseng describes how multiple images can be compressed, transmitted and recreated. According to Tseng, there are 5 images or viewpoints: I_C, I_B, I_T, I_L and I_R, relating to a central, bottom, top, left and right viewpoints (Figure 1 and Col. 3, lines 47-55). Even if one skilled in the art at the time of the invention could have related the left and right viewpoints of Tseng with the left and right images described by Trika, to properly combine Tseng and Trika, Tseng would have had to disclose a method of recreating the right viewpoint from the left viewpoint. However, Tseng is devoid of such a disclosure and only describes how to generate viewpoints from the central view; Tseng merely transmits the central view along with a depth map and various vectors to facilitate the reconstruction of the other 4 views (top, bottom, left and right). Furthermore, it would not have been obvious to those skilled in the art to have modified Tseng to generate stereoscopic left and right images from 5 multi-view images as the depth map is encoded relative to a central view which is not described by Trika. For this further reason, one skilled in the art would not have combined Tseng and Trika to obtain the claim 4 invention.

The action states that the Abstract of Trika "discloses using a transmitted video signal comprising 2D image data and depth map data to enable conversion of the 2D images and viewing of the converted 2D images in a stereoscopic viewing system." However, the Abstract refers to "generating stereoscopic displays" and not conversion of 2D images as called for in claim 4; tellingly, the term "conversion" does not appear in Trika.

Trika describes a method of displaying and transmitting an existing stereo pair consisting of a left and right eye image and reconstructing the image from the stereo pair as opposed to enabling conversion of 2D images and viewing the converted 2D images in a stereoscopic viewing system as recited in claim 4. Similarly, Tseng describes a method of transmitting 5 images or viewpoints, center, left, right, top and bottom. Tseng starts with 5 views: a center view, a top view, a bottom view, a left view and right view, and takes the center view and creates data which will enable the other 4 views to be *reconstructed* at the receiver end. The center view together with the other image data is transmitted. At the receiver end the center view is used together with the data to *reconstruct* the top view, the left view, the right view and the bottom view. That is, Tseng, alone or in combination with Trika, does not teach or suggest a transmitted

video signal enabling *conversion* of 2D images and viewing the *converted* 2D images in a stereoscopic viewing system as recited in claim 4.

For at least the aforementioned reasons, the combination of Tseng and Trika does not result in claim 4 invention and one of ordinary skill in the art would not have combined Tseng and Trika to obtain the claim 4 invention.

CONCLUSION

If any fees are required or if an overpayment is made, the Commissioner is authorized to debit or credit our Deposit Account No. 19-0733, accordingly.

All rejections having been addressed, applicant respectfully submits that the instant application is in condition for allowance, and respectfully solicits prompt notification of the same.

Respectfully submitted,
BANNER & WITCOFF, LTD.

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By: /Gary D. Fedorochko/
Gary D. Fedorochko
Registration No. 35,509

1100 13th Street, N.W., Suite 1200
Washington, D.C. 20005-4051
Tel: (202) 824-3000
Fax: (202) 824-3001
GDF:lab